d16 group

PHOSCYON

Bass Line

User Manual

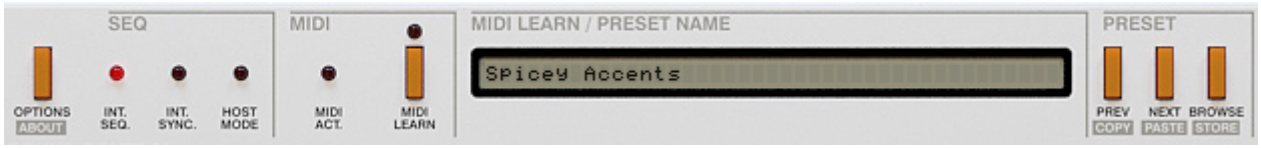
Overview

After loading the plug-in into the host application, the Phoscyon Graphic Interface will appear:

Graphical user interface

Phoscyon's interface is split into the following parts:

- **Control module** – On the top of the GUI there is a row of controls. These are responsible for selecting the plug-in Mode, MIDI learn and preset management.



Control module

- **Sound control section** – The next row contains one switch and twelve knobs. These are responsible for Phoscyon synthesis control.

Sound control section

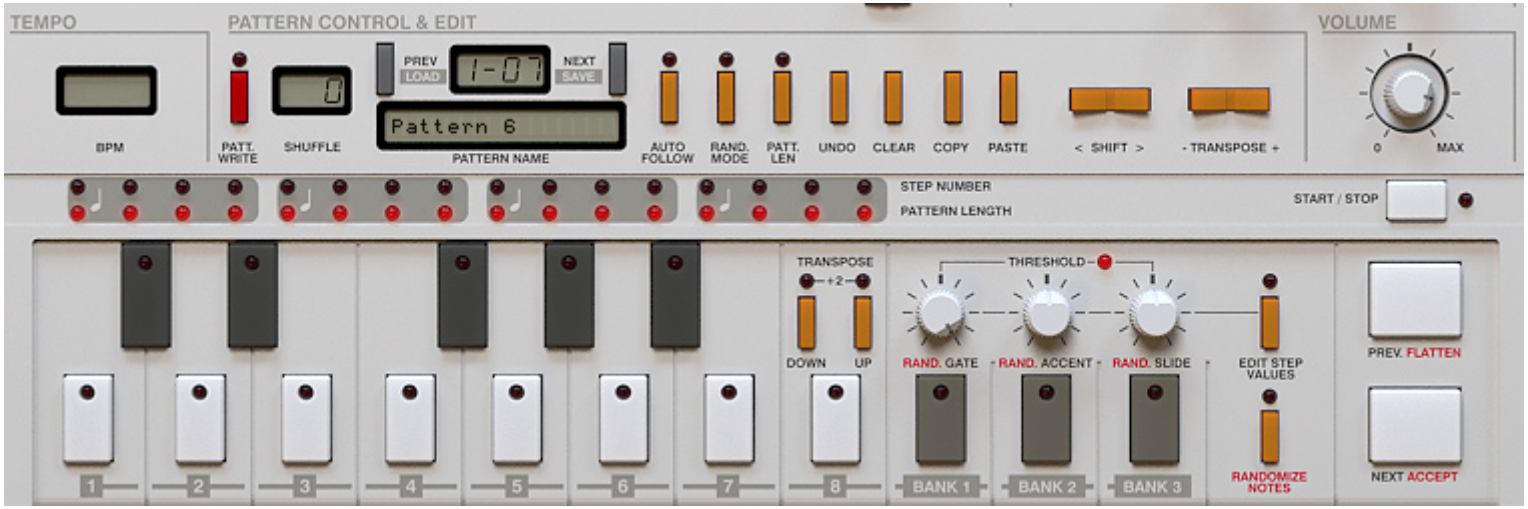
- **Arpeggiator** – To process incoming notes from sequencer (in **External** mode), or from internal sequencer (in **Internal** mode).

Arpeggiator section

- **Distortion** – Distortion effect unit to further process sound.

Distortion section

- **Internal sequencer** – Responsible for editing patterns in **Int.Seq.** mode.



Internal sequencer section

Work modes

The **Int.Seq.** switch allows selection of the sequencer Modes.

Plugin modes

Phoscyon works in two modes:

- **Internal** – In the **On** position Phoscyon uses the internal sequencer. Notes coming from the host (or using white keys from music keyboard on GUI) are used to control the order in which patterns play.
- **External** – In the **Off** position Phoscyon uses notes coming directly from the host sequencer to generate sound.

The next few chapters describe both of the sequencer Modes in detail.

Preset management

All the sound parameter settings (cutoff, resonance, etc.)

Sound control section

Distortion parameters

Distortion section

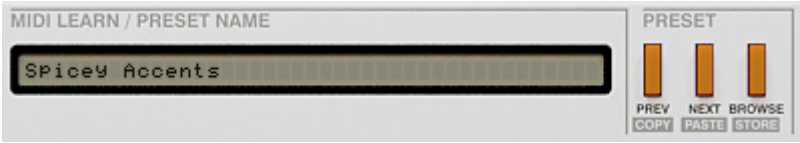
Arpeggiator parameters

Arpeggiator section

and **Volume** parameter are stored in a **Preset**.

Master volume

The **Preset browser** tool is provided to simplify the organization and use of Presets. The **Preset** section on GUI is used for navigation throughthe preset bank. To read more about preset management go to chapter Preset Management.



Preset section

Play modes

External Sequencer mode

Clicking the **Int.Seq** diode in the **Seq** box changes Phoscyon from using its internal sequencer to using notes from the host sequencer.

Plugin modes

In this Mode the plug-in acts as a regular sound module. A MIDI Note On message triggers the sound and MIDI Note Off message ends it.

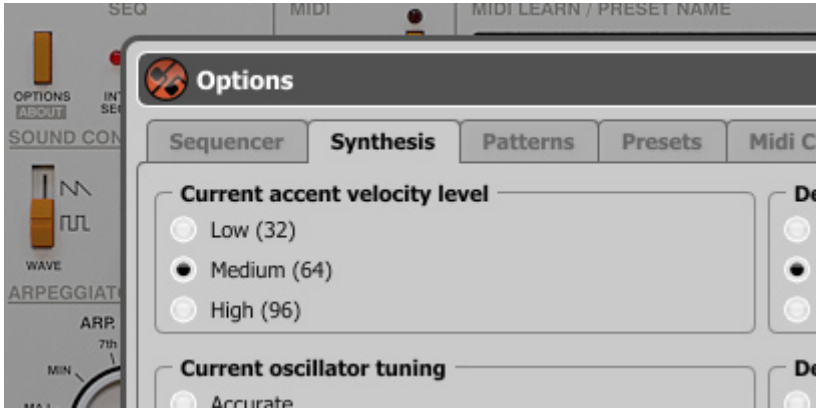
Only parameters controlling the sound, **Distortion** effect and the **Arpeggiator** work in this Mode.

Phoscyon is a monophonic synthesizer. This means that during play (triggered by a MIDI Note On), if another note comes (another MIDI Note On), the first note stops playing immediately and the next one starts to play. Between both notes a **Slide** is executed with the time set by the **Slide time** knob. In other words, the user can only play one note at a time. The user can also specify the amount of **Slide**.

Slide time knob

Accent velocity level

In **External** sequencer mode, sounds are accented when their velocity exceeds a certain value. Below this threshold value, sounds are played without **Accent**. You can choose one of the available predefined threshold values from the **Options** panel, **Synthesis** tab, **Current accent velocity level** group:



Current accent velocity level

This setting is stored within the host application's project.

Internal Sequencer mode

In **Internal** sequencer mode, Phoscyon uses the internal bank of patterns. Pressing **Play** on the host sequencer, or **Start** / **Stop** on Phoscyon, will start play back of the default internal patterns.

Start, stop button

The LED diode next to **Start** / **Stop** button indicates if a pattern is playing (it lights up).

➲ *Note: If a pattern is started using Phoscyon's **Start** / **Stop** button and the host sequencer has not been started, playback can only be stopped using the **Start** / **Stop** button on Phoscyon.*

Tempo synchronization

The **Int.Sync.** switch allows selection of the synchronization mode. For the **Off** value, Phoscyon synchronizes to the tempo of the host program.

Plugin modes

With **Int.Sync. On**, Phoscyon will use its own internal tempo.

Tempo control section

While Phoscyon is internally synchronized, the **Tempo** display shows current tempo.

Internal Pattern Storage

There are two internal **Play** modes:

- **Native mode** – available when the **Host mode** LED is turned off:

Plugin modes

- **Host mode** – when this LED is turned on.

Each of these modes shares a common pattern storage system. The whole bank of patterns comprises of 96 different patterns that can be triggered using GUI or MIDI messages (depending on the play mode).

Native mode

Phoscyon is in this mode when it is first loaded. This is the default mode. It allows a range of patterns (or single pattern) to be selected. When selected, Phoscyon will play and continually cycle through the patterns.

These patterns can be selected to play using the keyboard on the GUI.

Selecting pattern via music keyboard on GUI

The 8 white keys from the keyboard select the pattern. The **Gate**, **Accent** and **Slide** buttons (step attributes) are used to select the bank. This means that only 24 patterns can be selected. This is a limitation of **Native** mode. Alternatively, it is possible to select patterns from a MIDI keyboard using keys C1 to C2 to select the pattern in a bank, and keys D2, E2 and G2 to choose between one of the three available banks.

The currently selected pattern is shown on the Phoscyon interface:

Pattern display and navigation section

In format:
[BANK NUMBER]–[PATTERN NUMBER]

Below it is displayed the pattern's name (in **Pattern name** text box).

After loading Phoscyon, the pattern corresponding to the C1 note is chosen. The current pattern is marked by a blinking LED on one of the white keys on Phoscyon's keyboard. The bank is marked by LED on one of the last 3 attribute buttons: **Gate**, **Slide**, and **Accent**.

When the **Start** button is pressed, the LED on the **Step number** will indicate the current step in the pattern.

Step number and pattern length's LEDs

To select another pattern whilst playing, select it using the combination of one of the white keys and attribute button:

Selecting pattern via music keyboard on GUI

Or select it using the keys on a connected MIDI keyboard. The next pattern will start when the current pattern comes to the end of its final step.

Making a patterns' chain

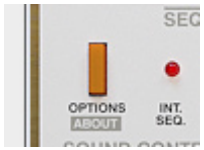
To select the start pattern, press the appropriate white key on Phoscyon's keyboard with the mouse. To select the last pattern in the range, select another pattern WHILST holding down the **CTRL** key on the keyboard. Phoscyon will now cycle up through the range and repeat. A Midi keyboard can be used to select a range to play. To do this, press the two notes on the keyboard, which cover the range, at the same time. Phoscyon will now cycle through this range and continually loop.

Whilst playing back in chain mode, selecting a different pattern (either using a Step key on the interface or key on MIDI keyboard) will cause Phoscyon to play that pattern next after coming to the last step in the currently playing pattern. It will then continue to play the new pattern until stopped.

Host mode

In **Host mode**, patterns are triggered using only MIDI notes. This allows access to the full bank of patterns stored within Phoscyon. Each note coming from the host program corresponds to one internal pattern. The whole bank of patterns is accessed by the 96 available MIDI notes (whole MIDI keyboard range without the first and last octave).

A **Note on** causes the corresponding pattern to play. Releasing the key and sending a **Note off** will eventually stop the pattern. It depends on whether the **Note Off Mode State** is set in configurational panel is checked. To change **Note Off Mode** open configurational window by clicking **Options** button:



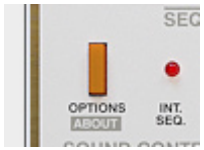
Options button

Go to **Sequencer** tab and check or uncheck the **Note Off Mode** checkbox in **Current Settings** group.

There's an another flag, which works in **Host mode**: **Self reset**.

When the **Self reset** flag is set, a **Note On** message (playing the same note) will restart the pattern (the pattern starts playing from the first step). If this attribute is not set then the pattern will not reset when a corresponding **Midi On** message arrives (when the same note is played). Playing any pattern for the first time or playing any pattern other than one preceding it will always reset said pattern.

To change **Self reset** flag,open configurational window by clicking **Options** button:

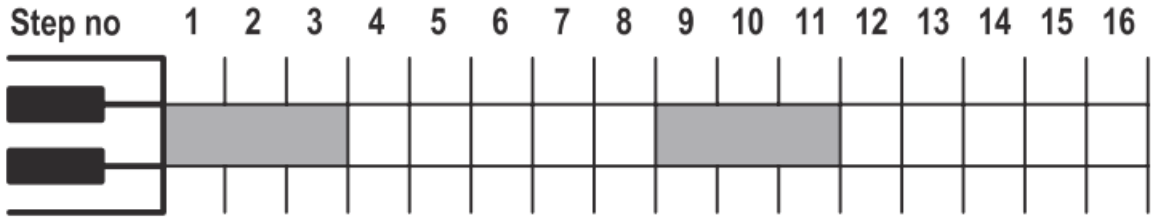


Options button

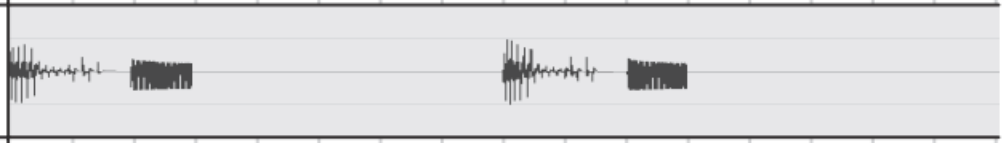
Go to **Sequencer** tab and check or uncheck the **Self Reset Mode** checkbox in **Current Settings** group.

This flag is most commonly used together with the **Note Off** flag. With these flags it is easy to fit a pattern of 5 steps with a pattern of 16 steps. You can do it by switching off both of the attributes (see the figure on the next page).

a



b

Note Off Clear	Self Reset	PHOSCYON will play:
OFF	OFF	
Steps of pattern:		1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1
ON	OFF	
Steps of pattern:		1 2 3 4 5 1 2 3 1 2 3 4 5 1 2 3
OFF	ON	
Steps of pattern:		1 2 3 4 5 1 2 3 1 2 3 4 5 1 2 3
ON	ON	
Steps of pattern:		1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8

Note off clear and self reset example

On the previous page we can see an example of **Self** reset and **Note** off usage.

a The MIDI note is triggering pattern.

b The actual sound in four different setting combinations.

It should be noted, in **Host mode** the **Start** / **Stop** button on Phoscyon does not function. Patterns are only played back while a key on a connected MIDI keyboard is pressed (and held).

In this mode, currently playing pattern is indicated by display unit:

Pattern display and navigation section

In format:
P.[TONE NAME][– or #][OCTAVE NUMBER]

Below it is displayed the pattern name (in **Pattern name** text box).

Midi output

Phoscyon has a permanently active MIDI output. This allows the control of external instruments (virtual or hardware) by Phoscyon's internal sequencer. It works either in **Native** or **Host** mode. Velocity values of MIDI notes sent by Phoscyon are calculated on a basis of **Step attributes** (accented or non-accented).

When Phoscyon is in **External** mode, it passes MIDI notes through itself unchanged.

Threshold mode

Threshold mode works only in **Internal** modes. **Edit step values** button allows you to switch this mode on/off but only in **Internal** mode. **Threshold** mode is active when **Edit step values** is off. Activation of **Threshold** mode is indicated by a **Threshold** led above **Rand.Gate**, **Rand.Accent** and **Rand.Slide** knobs.

Edit step values (button)

These knobs allow you to set threshold values for each of the attributes: **Gate**, **Accent**, and **Slide**. The threshold value for a given attribute of a step means that only attributes with values below the threshold value will be included (treated as switched on).

The leftmost position of a given knob's threshold value is equal to 0, and the rightmost is equal to 127. For attribute values ranging 0–127, it means that if the threshold value is equal to 0 then none of the attribute will be included. If the threshold value is equal to 127 then every (switched on) attribute will be included (no matter the value of the attribute).

Step values, threshold

Remember that these knobs work as described above only when **Threshold** mode is on. In **Internal** sequencer mode, with **Threshold** mode switched off, these knobs are responsible for setting the values of the proper attributes for each edited step (see **Step management** in the section **Internal** mode).

➲ *Note: If the threshold value for Gate attribute is equal to 0 then Phoscyon will not generate sound because attribute Gate for every step will not be included.*

Threshold mode can be very useful when the values of certain attributes need to be edited. Changing threshold values across time (e.g. with event edit in a host program) allows the user to control the attribute amount at any given moment. Another very important application of this mode is using it with the **Randomizer** (see the chapter **Randomizer**).

Synthesis

Controls

The block of synthesis controls is placed in the top portion of the Phoscyon GUI. These controls are described below:

Sound control section

- **Wave** – This switch allows the user to choose between saw or square waveforms.
- **Tuning** – This tunes the instrument continuously in the range of +/– 12 half-tones. (A–440Hz in the middle position).
- **Slide time** – Duration frequency change between two notes (slide/legato) with **Slide** attribute placed on the first of them. Left position corresponds to 0 ms (legato), middle position to about 60 ms (standard setting), and right position to about 1.5 s.
- **Cut off freq** – Filter cut off frequency. This is the frequency filter cut off which is added to the filter envelope. In other words, this parameter moves the range of effect of the filter envelope.
- **Reso link mode** – Allows the user to choose the work mode of the **Resonance** and **Sweep time** knobs. If it is turned on, the **Resonance** knob controls both resonance and sweep time parameters. **Sweep time** knob is inactive when **Link** is enabled. If it is turned off, the control of **Resonance** and **Sweep time** is divided respectively between the two knobs.
- **Resonance** – Controls the filter boost at the cut off frequency. If the **Reso link mode** switch (placed next to **Resonance** knob) is turned on, the knob also controls the speed of attack of the accent envelope (**Sweep time** parameter).

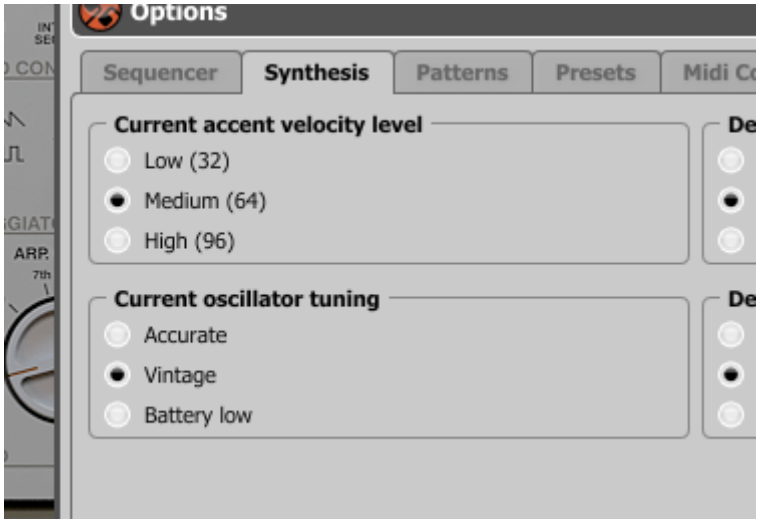
- **Sweep time** – Controls the speed of attack of the accent envelope if **Reso link mode** is turned off. If **Reso link mode** is turned on this knob is inactive.
- **Envmod** – Envelope modulation. Defines the range in which the filter envelope is affected. The higher the value of **Envmod** is set, the more gain the amplitude of the envelope has.
- **Env.Attack** – Envelope attack. Sets the attack time of the filter envelope.
- **Env.Decay** – Defines decay time of the filter envelope. This parameter applies only to notes without the **Accent** attribute.
- **Acc.Decay** – Defines decay time of filter envelope. This parameter applies only to notes with the **Accent** attribute.
- **Accent link mode** – Allows the user to choose the work mode of the **Env.Accent** and **Accent vol.** knobs. If it is turned on, the **Env.Accent** knob controls both envelope accent as accent volume parameters and the **Accent vol.** knob is inactive. If it is turned off, the control of **Env.Accent** and **Accent vol.** parameters is divided between the respective knobs.
- **Env.Accent** – Controls the accent level of the accent envelope on modification of the envelope filter (for notes with the **Accent** attribute). If the **Accent link mode** switch (placed next to **Env. Accent** knob) is turned on the knob also controls the **Accent vol.** parameter (for notes with the **Accent** attribute).
- **Accent vol.** – Controls the **Accent** volume parameter (for notes with the **Accent** attribute) if the **Accent link mode** is turned off. If the **Accent link mode** is turned on this knob is inactive.
- **Step length** – Defines the time of sound duration. Time of sustain in the range from about 0.1 of 16th note to full 16th note.

Aside from the controls listed above, there is one more knob belonging to the synthesis block. The **Volume** knob controls the volume of the sound the synthesizer produces. If the knob is in the extreme left position, the synthesizer stops processing. In the middle position volume of the sound is on normal level and no overdrive will appear. In the extreme right position the amplitude is up to +6dB.

Master volume

Oscillator tuning

Phoscyon has three tuning modes – selected from the **Options** panel (accessible via **Options** button). Go to **Synthesis** tab and select in **Current oscillator tuning** group.



Current oscillator tuning group

➲ *Note: This setting is stored within the host application project.*

There are three possible values:

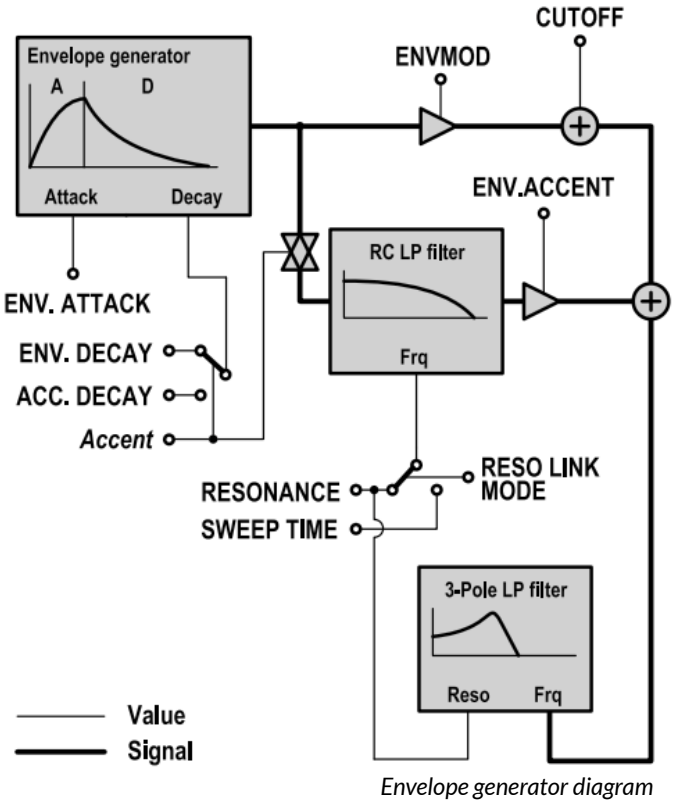
- **Accurate** – Linear tuning across the scale (precise).
- **Vintage** – Slightly de-linearized giving the impression of real vintage gear.
- **Batter Low** – Extremely detuned.

Filter envelope

The base element of the filter envelope circuit is the envelope generator which generates a base signal with two states: Attack and Decay. The duration of the Attack state is controlled by the **Env.Attack** parameter. However, the duration of the Decay state is controlled by the **Env.Decay** or **Acc.Decay** parameter depending on the state of the **Accent** attribute in a given step. If **Accent** is set then **Acc.Decay** is taken, otherwise **Env.Decay** is used. The generator is reset at each step not preceded by the **Slide** attribute. The amplitude of a generated envelope is always constant.

The signal from the envelope generator follows two paths:

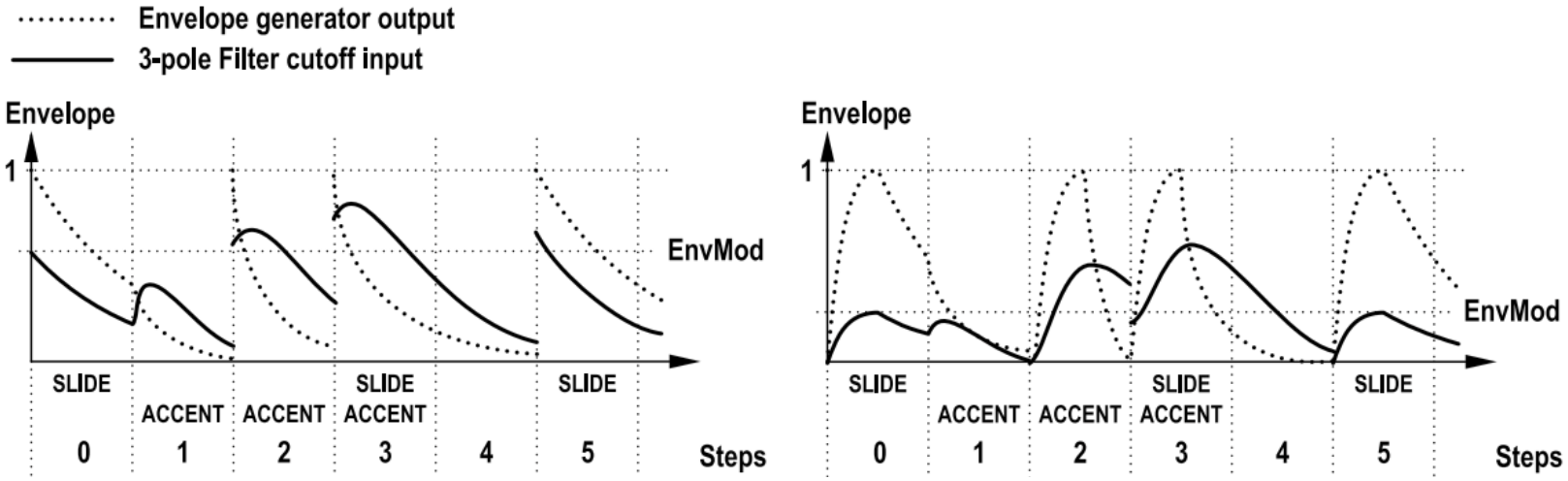
1. Depending on the **Accent** attribute state, the signal goes through the RC lowpass filter. The output amplitude of this filter is controlled by the **Env.Accent** parameter. The cut off frequency is controlled by the sweep time parameter (the **Resonance** or **Sweep time** knob depending on **Reso link** switch position).



Envelope generator diagram

2. The amplitude of the signal is controlled by the **Envmod** parameter and moved by the offset defined by the **Cutoff** parameter.

The signals from these two paths are summed up and the resulting signal controls the cut off frequency of the 3-pole lowpass filter. The RC lowpass filter smooths the envelope and moves frequency of the 3-pole filter up in step with the Accent attribute. In this way the famous "wow" is created. It should be mentioned that the output signal of the envelope generator controls the gain of the input signal amplitude. This makes accented tones sound louder than unaccented tones. The value of this gain is controlled by the **Accent vol.** parameter (**Env.Accent** or **Accent vol.** knob depending on the **Accent link mode** switch position).



Envelope generation process

	Envmod	Cutoff	Env.Att.	Env.Dec.	Acc.Dec.	Env.Acc.	Accent lnk.
a)	0.6	0.0	0.0	0.7	0.2	1.0	On
b)	0.2	0.0	0.2	0.4	0.2	1.0	On

Parameters for examples above

Bass line editing

Every pattern is a single track, with up to 16 steps. Each of these has attributes such **Note**, **Gate**, **Accent** and **Slide**.

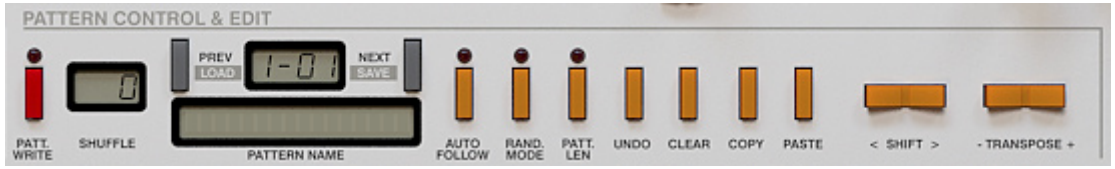
Attributes of step

- **Note** – defines the pitch that is played within each step.
- **Gate** – decides whether sound in the step is played or not. This only concerns the amplifier since the oscillator is set to the frequency of the step's note.
- **Accent** – determines whether a step will become accented. The volume of an accented step will be louder than steps which are not accented. Additionally, during an accented step, the other parameters are slightly changed.
- **Slide** – when a step has the Slide (portamento) attribute switched on, the pitch of this step will be held over to the next step with a simultaneous smooth tone change between each pitch.

The pattern editing

➲ *Note: Most of the controls used within pattern edit implement two functions. When either **Randomize** mode or **Threshold** mode is on, some of the controls have different functionality.*

The controls used with pattern editing are placed in the bottom half of the GUI and are labeled **Pattern control & edit**.



Pattern edit and pattern control sections

To edit the currently selected pattern, press the **Patt.Write** button (it is not necessary in **Host** mode since **Pattern write** is the only possible mode there).

Patt.write button

Phoscyon, by default, follows the edited pattern with one playing because of **Auto follow** button being turned on. **Auto follow** button works only when **Pattern write** mode is active.

Auto follow button

With the **Auto follow** button turned off, to choose a pattern to edit we need to navigate through the available patterns using the **Prev** and **Next** buttons. The playing pattern will not change but the edited pattern will be the newly selected one.

With **Auto follow** turned on, currently playing pattern becomes the edited one immediately and the switching between patterns using keys **Prev** and **Next** is disabled.

Pattern display and navigation section

➲ *Note: When **Auto follow** mode is on, the edited pattern changes to match the pattern which is playing. Prev and Next buttons do not work then.*

Entering notes

The one octave keyboard allows the user to set **Note** attributes for the pattern (for one step at a time).

Music keyboard

To be more precise, the keyboard sets the base of the note range C3–C4. To cover the entire range of notes in which the synthesizer operates, the user should use the **Transpose** buttons.

Octave transpose buttons

These allow the user to set the note transposition for an edited step in the range of −1 to +2 octaves. With the base note range of C3 to C4, it allows a total range from C2 to C6 to be selected. When only the **Transpose down** attribute is set, it indicates a transposition down 1 octave. When only the **Transpose up** attribute is set, it indicates transposition up 1 octave. When both of these attributes are set it indicates a transposition up 2 octaves.

Entering step attributes

Gate, **Accent**, **Slide** – These three buttons control the states of their corresponding attributes (**Gate**, **Accent** and **Slide**) for an edited step.

Gate, accent, slide buttons

Entering step values

Aside from their states (switched on/off), **Gate**, **Accent** and **Slide** also have their own values that range 0–127. These values can be set per each step in **Internal** mode.

Step values, threshold

Values can be entered when **Edit step values** button is on:

Edit step values (button)

Those values are useful in a **Threshold** mode or during bass line randomization.

Navigating trough steps in pattern

Prev.Flatten, **Next accept** – These two buttons allow changes of position within a pattern with regard to pattern length. Pressing the **Next** button moves the position to the next step while pressing the **Prev** button moves position to the previous step.

Next and prev buttons

The number of the step is indicated on the display **Step number** LEDs. You can also use those LEDs to choose the edited step directly without going through pattern using **Prev**, **Next** buttons.

Step number and pattern length's LEDs

Editing functions

Pattern edit section

- **Clear** – Resets all attributes of the pattern. This means that the settings will be as follows: **Note** equal to C3, **Gate**, **Accent** and **Slide** attributes are switched off and their values are equal to 0. Before clearing the pattern completely, its content is copied to the undo buffer.
- **Copy** – Copy all the pattern contents. Meaning: the length of pattern, states of its attributes and all of the step contents.
- **Paste** – Replaces pattern content with the content from the clipboard (if there is any content in the clipboard).
- **Shift** – Nudges the pattern content to the right or left depending on the arrow that is pushed on the rocker switch. Pressing once shifts by 1 step. All attributes of the step are shifted as well.
- **Transpose** – Transposes the contents of the pattern up or down by 1 half tone. The notes are wrapped at the ends of the keyboard note range. This means that note C5 changes into B2 when it is transposed up and note C2 changes into B4 when it is transposed down.

To select the destination pattern (for copying), use the **Prev** and **Next** buttons (with **Auto follow** turned off) or leave **Patt.Write** mode and choose another pattern to edit that way, enter **Patt.Write** mode.

Pattern display and navigation section

Length of pattern

In **Pattern write** mode, the length of currently selected pattern can be set using the **Pattern length** LED row. First, press the **Patt.Len** button on **Pattern control** section.

Pattern control section

The **Pattern name** edit box will show **Set Length** message. The length is set by clicking on a LED representing the last step on this row (the LED representing length of pattern will be blinking).

Step number and pattern length's LEDs

Controlling the tempo

Tempo control section

When the synthesizer works in internal clock mode (**Int.Clock.** LED is on), the adjustment of internal tempo settings can be done with the tempo controls placed in the mid-left area of the GUI. The internal tempo parameter has a range of **40–300** BPM (Beats Per Minute).

The **BPM** display is used to adjust the tempo value by dragging any of the decimal places with the mouse.

Tempo value is stored per pattern and can be change only in **Patt.Write** mode.

Shuffle

Shuffle is also called Syncopation or Swing, It is added by dragging the **Shuffle** display when in **Pattern write** mode. **Shuffle** is represented by values from 0 to 100 (percent). When it is set to 0, shuffle is turned off and notes are spread equally within the pattern. Increasing the value causes the shuffle effect to be more pronounced.

Shuffle display

Shuffle value is stored per pattern independently.

Loading and saving patterns

It is possible to save or load a single pattern or a complete bank of patterns.

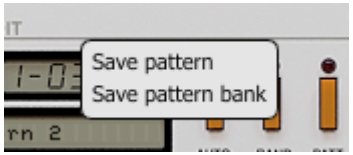
Saving patterns

1. Before saving, the pattern should be named (click on **Pattern** name display):

Pattern display and navigation section

   Just click on it and enter the name for the newly created pattern. Pressing enter ends the editing process.

2. To save pattern just click **Next** button with **CTRL** (On **MacOS** use **Apple CMD** key instead of **CTRL** key) key pressed on keyboard. The menu should appear:



Saving pattern

   Choose the **Save pattern** option to show file save dialog. To save all patterns currently stored in Phoscyon, choose **Save pattern bank** option.

Loading patterns

To load pattern click **Prev** button with **CTRL** key pressed on keyboard. The menu should appear:

Loading pattern

Choose the **Load pattern** option to show file dialog. To load whole bank of patterns to Phoscyon's memory, choose **Load pattern bank** option.

➲ *Note: Files saved by Phoscyon are in standard **XML** format and can be easily edited within any text editor.*

Following file types are saved and loaded by Phoscyon:

- **.phptrb** – Bank consisting all 96 patterns.
- **.phptr** – Single pattern.

Randomizing basslines

Randomizer

The **Randomizer** fills the internal patterns with random complex content (it works only in **Internal** mode). When the randomizer is switched on, the LEDs of the controls affected by it start to blink. When randomizer is active, **Threshold** mode cannot be turned off (it changes the use of the **Event threshold** knobs). Turning on the randomizer is performed by pressing the **Rand.Mode** button.

Rand.mode button

Almost all the controls used with randomizer have more than one function. These controls are double labeled. The red colored labels describe the behavior of the control when used with randomizer.

Their altered uses are as follows:

- **Prev.Flatten**, **Next Accept** – These buttons allow you to move to the previously written or the next written sequence.

Next and prev buttons

- **Randomize notes**, **Rand.Gate**, **Rand.Accent**, **Rand.Slide** – The state of these buttons define whether Randomizer will write corresponding attributes or not. This feature allows the user to choose which attributes will change or not. It also allows the exclusion of chosen attributes from being written after reaching their expected settings (leaving them untouched).

Random notes, gate, accent, slide

E.g. When **Randomize notes** and **Rand.Gate** are set while **Rand.Accent** and **Rand.Slide** are not, only values of **Note** and **Gate** will be written while values of **Accent** and **Slide** stay unchanged.

Using the values of **Gate**, **Accent** and **Slide** means that the state of the attribute is always set (in all the steps of the edited pattern). However, its value is written from its full range (0–127). Due to the fact that **Threshold** mode is always set when using **Randomizer**, the density of these attributes can be easily controlled with the **Event threshold** knobs.

Step values, threshold

- **Notes**, **Transpose Up** / **Down** – The one octave keyboard allows you to define the pool (set) of notes from which **Randomizer** will select note values. Together with the **Transpose Up** / **Down** buttons it can define another pool of notes for each of four octaves. The randomizer selects notes from a pool defined by all octave pools.

  If only **Transpose down** is set, the **Randomizer** selects from the 2nd octave. If only **Transpose up** is set, it selects from the 4th octave. If both **Transpose Up** / **Down** are set, it will select from the 5th octave. If no transpose is selected, notes are selected from the 3rd octave.

Transpose buttons

➲ *Note: This function is active only when the Randomize notes attribute is set. In any other case the controls stay inactive.*

- **Arp.Chord** – With this switch, the pool of notes used for drawing can be easily reduced to set of notes contained in a specific chord. When one of the predefined chords is set, the drawing pools for all four octaves are initially set to notes contained in that chord. Then, the pools can be modified. For **Custom** setting, the note selection pools need to be set by the user. The custom drawing pool is remembered even after Rand chord is changed.

Arp. chord, rand. chord dial

- **Transpose** – With the **Transpose** rocker switch all notes can be transposed up or down one half-tone (the notes are then treated as one chord and transposed together). With this feature, **Randomizer** can be easily set to draw notes from specific keys e.g. only notes from E-Major. Only notes from drawing pools are transposed. The actual values of step notes stay unchanged.

Pattern edit section

- **Clear** – When pressing the **Clear** button in **Randomizer** mode the drawing pool is cleared. When the **CTRL** key is held while pressing **Clear** all notes in the edited drawing pool are set.

Pattern edit section

- **Prev.Flatten** – As it was mentioned above, the states of **Gate**, **Accent** and **Slide** attributes are always set when they are drawn. This means that after drawing a pattern and changing one of the **Event threshold** knobs the pattern will sound different. This is because all states of attributes are set so only the threshold value for the attribute decides which of them will be included or not. **Flatten** deals with this problem and saves wanted density of attributes.

  This function is activated by pressing the proper button with **CTRL** key held. It changes the states of the attributes depending on the values of the attributes and threshold values. The function operates only on the attributes for which the corresponding **Randomizer** attributes (**Rand.Gate**, **Rand.Accent** and **Rand.Slide**) are set.

Next and prev buttons

Let us say we have drawn a pattern and after it, we have set threshold values for **Gate** and **Slide**. We want to save their values and make them independent of their threshold values. We want also to leave the **Accent** attribute dependent on its threshold value. So, we make sure that **Rand.Accent** is not set while **Rand.Gate** and **Rand.Slide** are set. Next, we use the **Flatten** function. The resulting states and values of the **Accent** attribute do not change However, states for the **Gate** and **Slide** attributes stay active only for the steps in which the value of the attribute is lower than its threshold value at the moment the function was activated. The values of the **Gate** and **Slide** attributes for all steps are set equal to 0.

In other words the **Flatten** function limits ("clips" the attributes of the steps with values exceeding the threshold value.

- **Next Accept** – Each time you press this button you randomize new bass line or just a pattern's attributes accordingly to the chosen settings. Pressing this button with **CTRL** button accepts current state and it is added to a undo buffer. This makes it possible to go back to this state using the **Undo** button after further randomizations.

Next and prev buttons

- **Undo** – Goes back to the latest **Accepted** randomized state.

Pattern edit section

Arpeggiator

Controls

The block of **Arpeggiator** controls is placed in the center of the Phoscyon GUI.

Arpeggiator section

➲ *Note: The defined chord is not taken into account if the **Arpeggiator** is turned off.*

- **Arp.Chord** – switch is responsible for setting the tone set for the **Arpeggiator**.

  This switch implements two functions. When **Randomizer** is turned off, the switch is connected to the **Arpeggiator**. However, if **Randomizer** is turned on (only in Internal mode) the switch is connected to the **Randomizer**. When setting the tone of the **Arpeggiator**, the user can choose one of the defined chord types (Major, M7, Dim, etc) or choose a **Custom** chord defined by them.

- **Arp.Mode** – The **Off** position keeps the **Arpeggiator** turned off. Positions from **Random** to **Up-Down** allow the user to set the run-time mode of **Arpeggiator**. It controls the order of the playing notes.

➲ *Note: This control works only when **Arpeggiator** is turned on, otherwise it's disabled.*

- **Arp.Shuffle** – Decides how much of swing (syncopation) is added to sequence generated by Arpeggiator. Changing value is performed by dragging the **Arp.Shuffle** display. Shuffle is represented values from 0 to 100 (percentage), when it's set to 0, shuffle is turned off and notes are spread equally in time. Increasing value causes Shuffle effect more audible and pattern more swinging.

➲ *Note: If all the octave buttons on the **Arpeggiator** are turned off and the **Arpeggiator** is turned on, then Phoscyon will play as if the octave 0 button was still turned on.*

➲ *Note: Value 1.5 for **Arp.Repeater** is omitted.*

- **Oct.Range** – These four buttons allow the range of the octaves that **Arpeggiator** will play to be set. Initial **Arpeggiator** notes are transposed in the range of active octaves. The method of transition between octaves depends on the **Arp.Mode**. The number of octaves (from −1 to +2) are given relative to the increase or decrease in the octave of the initial note.
- **Arp.Tempo multiplier** / **Arp.Repeater** – If the horizontal switch (placed under the multi-plier/repeater switch) is in the left position, the multiplier/repeater switch controls the value of the **Arp.Tempo** multiplier which is the tempo multiplication factor. If the mentioned switch is in the right position then the multiplier/repeater switch controls the value of **Arp.Repeater**. This value responds to the number of repetitions of every note from the defined chord on the **Arpeggiator**.

Usage

The **Arpeggiator** allows the user to program the notes used by Phoscyon, the range of octaves, number of repetitions, tempo multiplying etc. During operation, the **Arpeggiator** increases note repetition by the following means. When the value of this counter reaches the value of the **Repeater**, the **Arpeggiator** takes the next defined note and resets the counter. After reaching the last of the defined notes, the **Arpeggiator** changes to the next octave defined by the octave range and sets the first of defined notes again. When the last octave from the defined octave range is reached, the whole cycle repeats.

- In **External** mode the **Arpeggiator** input notes come directly from the host. When two or more notes start or end at the same time, the host decides the order in which to send the notes to Phoscyon At the same time, Phoscyon decides what order to push the notes into the queue. Setting such notes with a little time distance stops any issues from occurring.
- In **Internal** mode the **Arpeggiator** input notes come from the internal sequencer. With internal patterns, it can be set to only one note per step. If the step has no **Gate** attribute it corresponds to a sequence of two messages: **Note On** and **Note Off** (just like pressing and releasing a piano key). If a step has a **Gate** attribute it means that only **Note On** message (pressing and holding key) is sent. The **Note Off** message will appear when the step with other note arrives or when a step with no **Gate** attribute comes along.

When the **Arpeggiator** is turned on the **Accent** and **Slide** attributes work in the same way as when the **Arpeggiator** is turned off. The attributes can be used to create complicated **Arpeggiator** sequences.

The **Arpeggiator** sequences can be used while playing live as well.

Arpeggiator tone

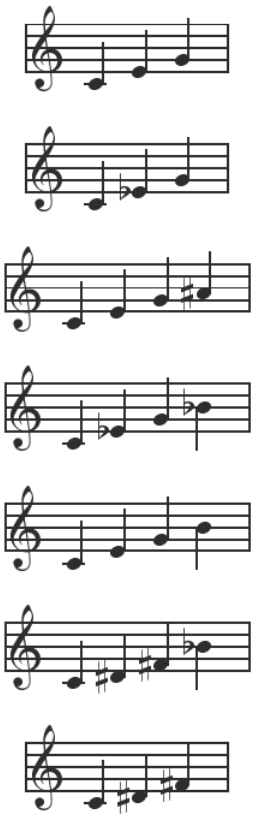
With the **Arp.Chord** switch the user can choose the **Custom** tone mode or one of 7 predefined tones.

Arp. chord, rand. chord dial

In the **Custom** mode the tone is created from incoming notes (from host application).

With the 7 predefined chord types the **Arpeggiator** works a little different. All tones produced are part of the specified chord. All predefined tones are illustrated in the figure on the next page.

Major	C,E,G
Minor	C,D♯,G
7th	C,E,G,A♯
m7th	C,D♯,G,A♯
M7	C,E,G,B
m7-5	C,D♯,F♯,A♯
Dim	C,D♯,F♯



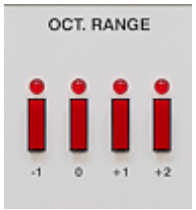
Predefined arpeggiator chords

Notes coming into the **Arpeggiator** (message **Note On**) are not queued as in the case of the **Custom** tone (like regular arpeggio), only the last incoming note is given attention. This note is used as a base note for the chosen (defined) chord. This means that the chosen chord is played in relation to this base note. E.g. a Major tone with the base note C3 will form a C-Major chord into 3-rd octave, and the base note E4 will form an E-Major chord into 4-th octave.

If any new note comes in it transposes playing sequence immediately.

The range of octaves

The **Arpeggiator** transposes notes from a defined tone in the range from −1 to +2 octaves. Switching to the chosen octave causes this octave to be used during **Arpeggiator** operation. **Arpeggiator** plays only if at least one octave is used. The mode of transition between octaves depends on the **Arp.Mode** settings.



Arpeggiator's octave range

The changes in the set of octaves do not take place until the last note from the defined tone is played. The **Arpeggiator** then resets the note position within the defined tone and changes the set of octaves.

If the value of the transposed note exceeds Phoscyon's note range (C2–B5), it is then wrapped at the ends. Transposed notes above B5 are moved to the lower end of the range (above C2). Transposed notes below C2 are moved to the upper end of range (below B5).

Arpeggiator run-time modes

With the **Arp.Mode** switch the user can choose from one of 5 run-time Modes:

Arp. mode dial

- **Off** – **Arpeggiator** is off.
- **Random** – **Arpeggiator** draws octave randomly.
- **Up** – The transitions between notes from defined chord are “normal” which means that notes are changed in the same order that they are specified in the defined chord. After reaching the last note the first note will be played again and also the octave from the defined set will change. Octaves from defined sets of octaves are changed increasingly from the lowest one. After reaching the highest one it starts over from the lowest octave again. E.g. for a set of octaves equal to (−1, 0, +2) the octaves will change as follows: −1, 0, +2, −1, 0, +2, …
- **Down** – The transitions between notes are “normal” also. However, octaves from the defined range are changed decreasingly from the highest and after reaching the lowest it starts from the highest octave again. E.g. for a set of octaves equal to (−1, 0, +2) the octaves will change as follows: +2, 0, −1, +2, 0, −1, …
- **Up-Down** – The transitions between notes are also “normal”. The way of transition between octaves from the defined set changes in cycles: Up, Down, Up, Down, … E.g. for a set of octaves equal to (−1, 0, +2) the octaves will change as follows: −1, 0, +2, 0, −1, 0, +2, 0, …

Arpeggiator repetitions

Arp.Repeater parameter allows the user to define the number of repetitions of every note from a defined chord before **Arpeggiator** will go to the next note of the chord.

Arpeggiator's tempo multiplier and repeater

Multiplication of tempo

The **Arp.Tempo** multiplier parameter defines the multiplication factor of the tempo of the **Arpeggiator**. This follows in relation to the tempo of Phoscyon, be it the tempo of the host program in **External** mode or that of the internal sequencer in **Internal** mode. This feature means that for a multiplication factor equal to x, the **Arpeggiator** will execute x steps of its internal work during one step.

Arpeggiator's tempo multiplier and repeater

Distortion

The distortion effect deforms the sound of the synth section and enhances high frequencies making the sound become more expressive while adding to the cut-off frequency of the synth filter. With the distortion effect switched off, the synthesis of low frequencies is at a low volume level because of the poor high frequency content (though using external EQ can change this).

➲ *Hint: The distortion effect can be used for something it was not exactly created for.*

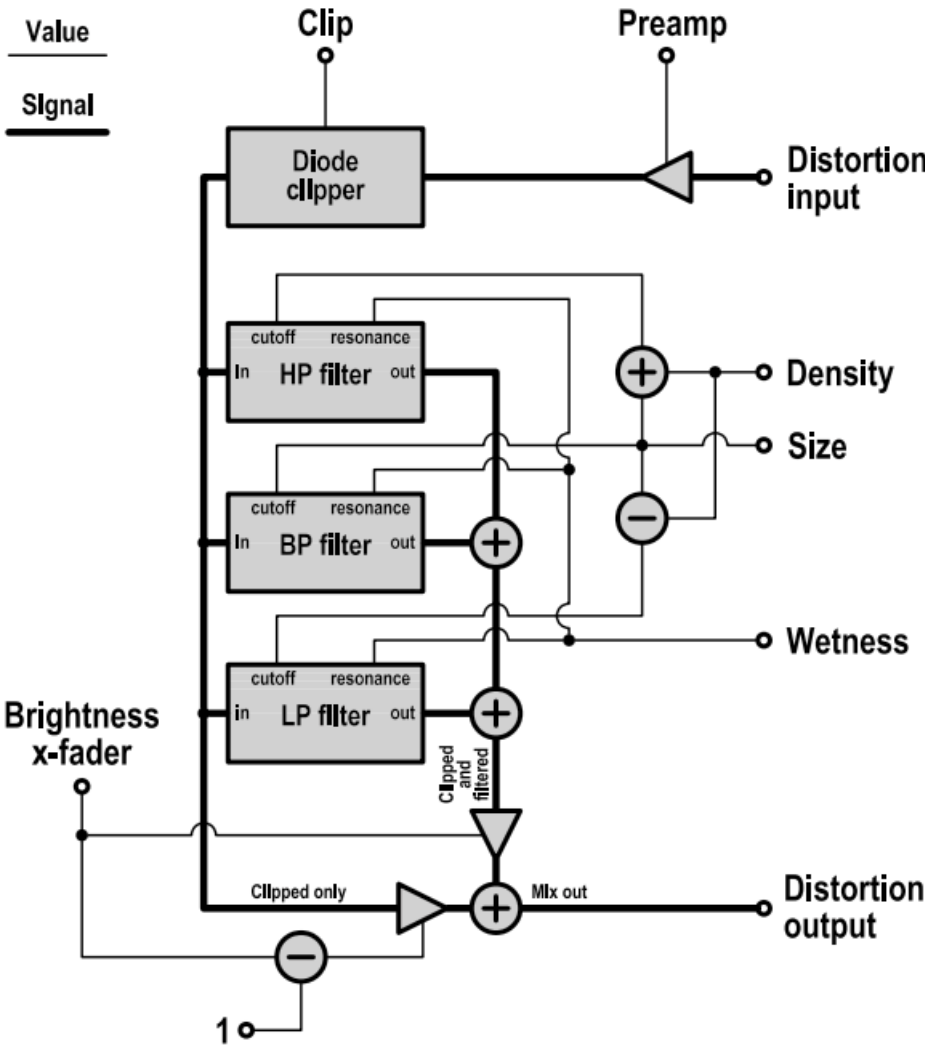
To obtain the constant level of amplitude desired from the Phoscyon (both on low as well as on high frequencies), the distortion effect can be used. However, a separate compressor can also be used.

Turning the **Preamp** to the left, and **Clip** and **Brightness** to the right will give a non-distorted sound processed through the diode-clipper. With these settings, the signal goes together through LowPass, BandPass and HighPass filters. When additional events for the **Size** and **Density** parameters are set, the sound will become similar to a phaser effect.

Structure

In the distortion block (see the figure below) the signal from the synthesizer is processed as follows:

1. The signal is amplified proportional to the **Preamp** parameter.
2. Depending on **Clip** parameter settings, the signal comes through the **diode-clipper**.
3. The signal is sent proportionally to three filters: LowPass, BandPass and HighPass whose frequencies are controlled by **Size** and **Density** parameters. The resonance is controlled by the **Wetness** parameter.
4. Outputs of all the filters are summed up.
5. The filtered signal and signal from the **diode-clipper** are cross-faded (the **Brightness** parameter) and is finally sent to the output of the Phoscyon.



Distortion block diagram

Controls

The block of **Distortion** controls are placed in the top-right area of the GUI. There are six knobs which give total control over the distorted sound:

Distortion section

- **Preamp** – The level of gain for the **Distortion** input signal.

  Defines the gain of the signal that goes into the **Distortion** effect. The leftmost position gives no additional gain while the rightmost position gives +60 dB.

- **Clip** – The clip level of the input signal.

  Signal coming to the **Distortion** block can be clipped to define the level of amplitude. The rightmost position of the knob means no clipping (the amplitude is at 0 dB). The leftmost position indicates that the signal is clipped. To get a more distorted sound you can use **Clip** with the **Preamp** parameter which adds gain to the signal before clipping it.

- **Size** – Controls the middle frequency of the BandPass filter.

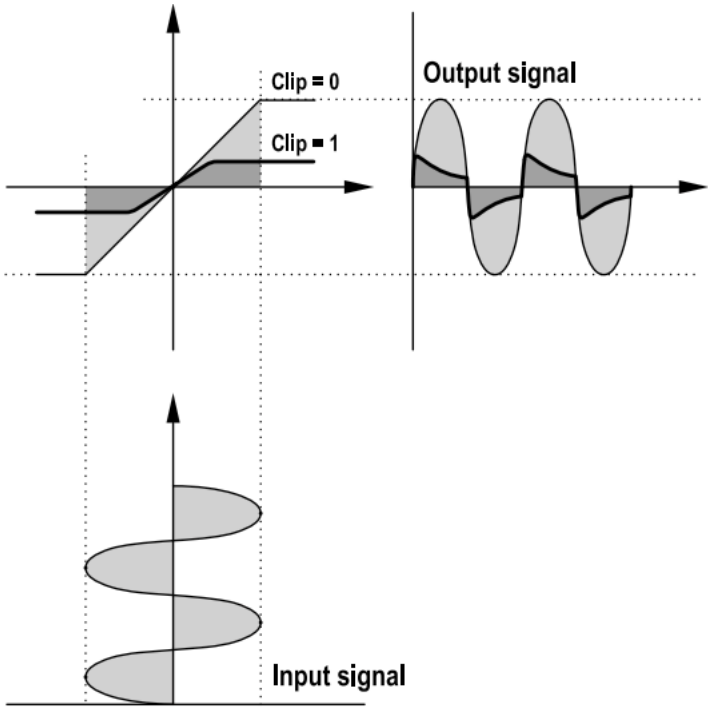
  Controls the middle frequency of the BandPass filter in the range of 0Hz (left position) to 22050 Hz (right position). This parameter also indirectly controls the cut off frequencies of LowPass and HighPass filters. The cut-off frequency of each of them is moved up or down from the mid frequency of BandPass by roughly the offset amount controlled by the parameter **Density**.

- **Wetness** – Controls resonance of the filters.

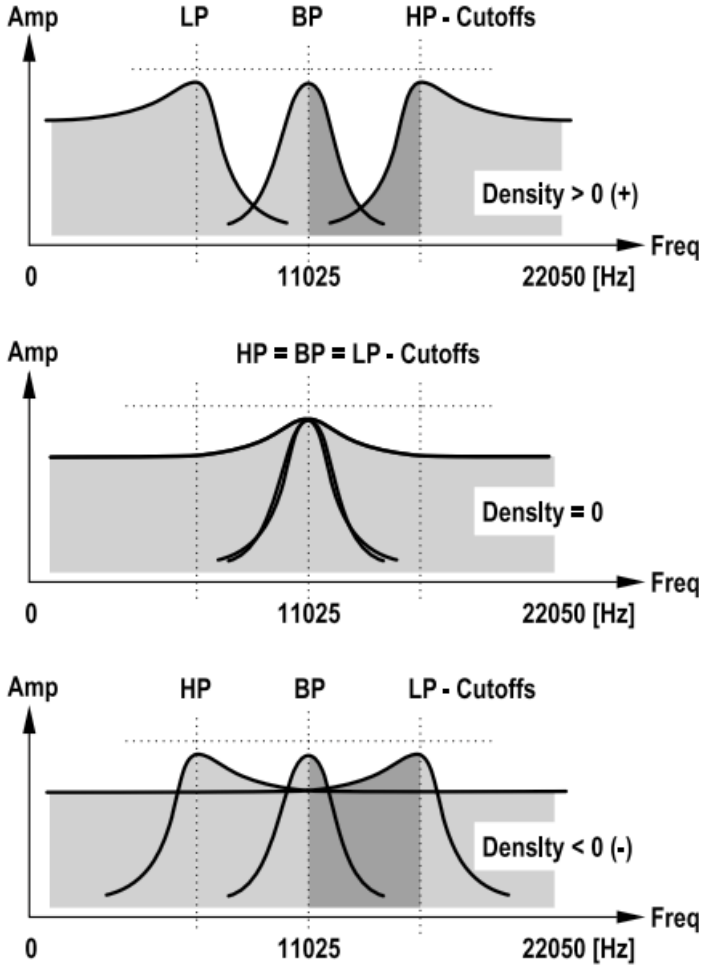
  Controls the boost of the cut-off frequency of the LowPass and HighPass filters and the bandwidth of the BandPass filter. The left position means no boost and a wide band while the right position means maximal boost and a tight band.

- **Brightness** – Expressiveness of sound.

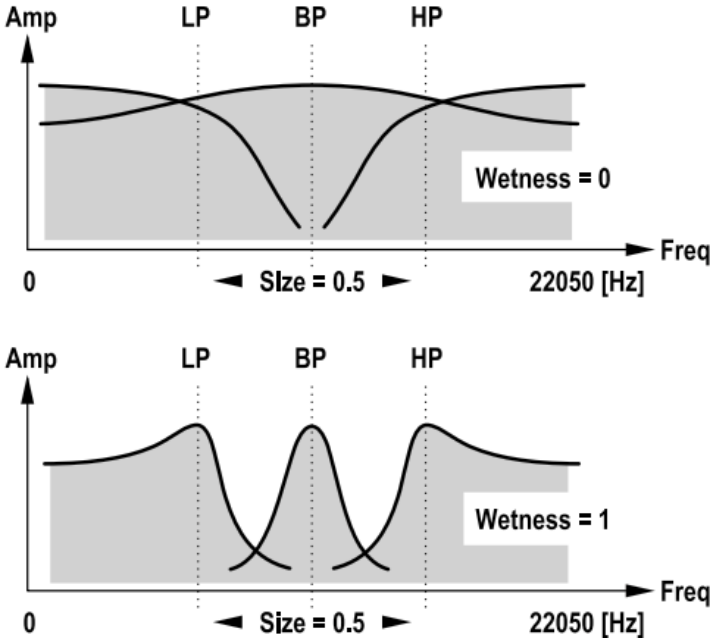
  Controls the position of the cross-fader used between filtered and non-filtered signal. The left position means that all non-filtered signal comes through the cross-fader and the signal is not filtered (when this is the case the parameters **Size**, **Density** and **Wetness** don't affect the sound). The right position means the exactly opposite situation while the mid position means an even mix of the two.



Distortion diode clipper



Distortion's density parameter



Distortion's wetness parameter

Pre/Post Eq Switch

This switch is responsible for choosing the distortion work mode. (diagram above the signal flow in the distortion effect). We can distinguish two blocks in figure, **Diode clipper** with preamp and **Equalizer** (containing three filters: BandPass, LowPass, and HighPass).

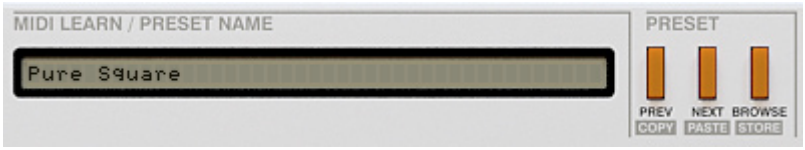
Distortion's Pre / Post Eq switch

- When the switch is set to the **Pre** position, the signal comes through the **Equalizer** and next through the **Diode Clipper** with preamp.
- When the switch is set to the **Post** position, then the signal comes through the **Diode Clipper** and next through the **Equalizer**.

Preset Management

Browsing presets

Presets in the plug-in are hierarchically organized in groups and, contrary to the linear structure, this setting is not compatible with the native methods used within the host application. The user can see the presets assigned to particular groups in the **Preset Browser**. Groups can be also defined by the user.



Preset management section

Controls available in the preset selection section:

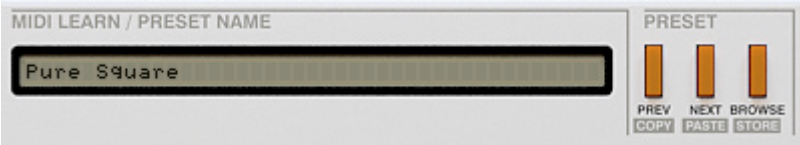
- **Preset name** – Displays the name of the selected preset. Allows editing of the preset name before saving the preset. Clicking on the control causes a shift into edit mode. After applying changes through the keyboard, confirm the new name with the Enter button.
- **Prev** / **Next** – Buttons used to navigate through the preset bank. **Next** button moves the browser to the next preset. If the current preset is the last preset in a group, pressing **Next** moves the browser to the first preset in the subsequent group. **Prev** button moves the browser to the previous preset. If the current preset is the first preset in a group, pressing **Prev** moves the browser to the last preset in the preceding group.
- **Prev** + **CTRL** – **Prev** button pressed while holding **CTRL** copies the edited preset to the buffer.
- **Next** + **CTRL** – **Next** button pressed while holding **CTRL** pastes the buffer to the current preset with postfix "_copy" added to its name.
- **Browse** – Opens a **Preset Browser** menu.

➲ *Note: On **MacOS** use **Apple CMD** key instead of **CTRL** key.*

Changes in the preset bank are not permanent. After removing and reloading the plug-in, the default preset bank will be loaded. However, saving the project within the host application will also save the status of the plug-in including changes in the preset bank. After reloading the project, all changes in the current parameter settings and in the preset bank will be restored.

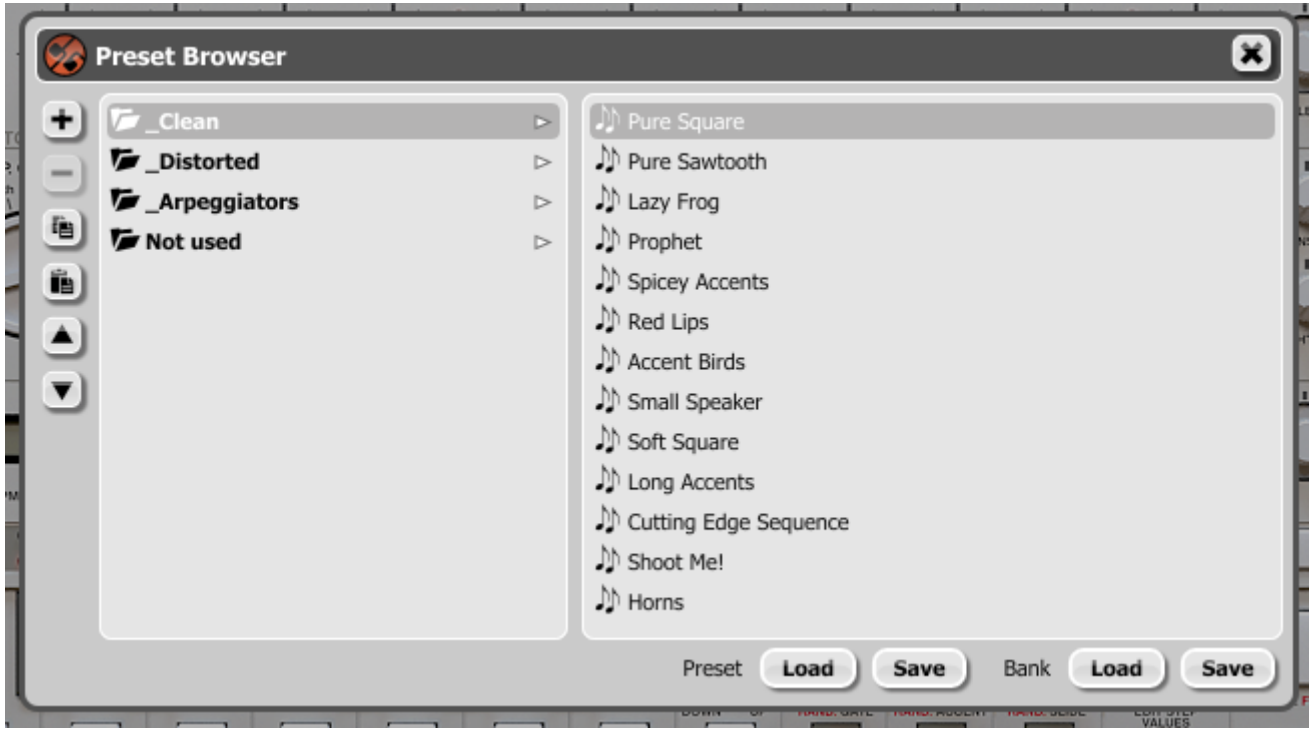
Preset Browser

As it was mentioned, the preset bank in the plug-in has a hierarchical structure i.e. presets are organized in groups. Presets can be selected by Next/Prev buttons, which navigate through the structure in a linear way or by using the **Preset Browser**. The **Preset Browser** is a tool which allows to easily manage the preset structure. To open it, click **Browse** in the preset selection section:



Preset management section

The **Preset Browser** will be displayed on the GUI:



Preset browser

The left side shows the list of groups in the preset bank:

List of groups in the preset bank

The right side shows the list of presets in the selected group:

List of presets in the selected group

Actions available in the **Preset Browser**:

- Clicking on a slot in the preset list loads the selected preset.
- Clicking on a slot in the group list selects a group of presets.
- Both presets and groups can be renamed. Double clicking on a slot toggles edit mode. After entering the new name, press enter to finish.
- The bank of presets has exactly 128 items. The number of presets cannot be changed. This means that there is no possibility of adding or removing presets. Only relocating them between groups or changing their order is possible.

  By dragging the preset you may:

  – Change its position in the group by dropping it in a different slot in the list of presets in a selected group.

  – Move the preset to a different group by dragging and dropping it in the chosen slot in the group list.

  Holding CTRL or SHIFT and using the mouse button allows to select more presets:

  – Holding CTRL and clicking on presets selects single items.

  – Using SHIFT allows to select a range of presets. The first click marks the beginning of the range and the second click marks the end.

  When more than one presets are selected, it is possible to drag them to a different group.

➲ *Note: Changing the order of presets in a group is possible for a selected single preset. Changing the order by dragging several presets in a group is inactive.*

On the left side of the **Preset Browser** there are function buttons located:

Function buttons of the Preset Browser

– Adds a new empty group to the preset bank.

– Removes a group from the preset bank, but only if the selected group is empty. Before removing a group, remaining presets should be relocated to different groups. An empty group can be recognized by the lack of bold font and the lack of a pointer on the right from its name.

Empty group in the Preset Browser

– Pastes the edited preset to the buffer; works exactly like the combination of **Prev** and **CTRL**.

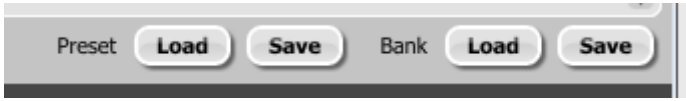
– Overwrites the selected preset with the buffer content; works exactly like the combination of **Next** and **CTRL**. The postfix "_copy" is added to the name of the preset pasted from the buffer.

– Works exactly like **Prev** on GUI; allows to move backwards on the hierarchical structure of presets.

– Works exactly like **Next** on GUI; allows to move forward on the hierarchical structure of presets.

Loading and Saving presets

At the bottom of the **Preset Browser** there are function buttons which allow to save/load presets on/from the hard drive.



Loading and Saving presets from the hard drive functions

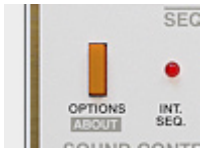
Four buttons are available:

- Preset **Load** – loads a single preset from a file (file .phprs – Phoscyon preset).
- Preset **Save** – saves the current preset to a file.
- Bank **Load** – loads the entire bank of presets from a file (file .phprb – Phoscyon bank).
- Bank **Save** – saves the entire bank of presets to a file.

➲ *Note: Before saving the preset to a file, save it in Phoscyon using **CTRL** + **Browse** when **On demand** function is selected in the plug-in configuration.*

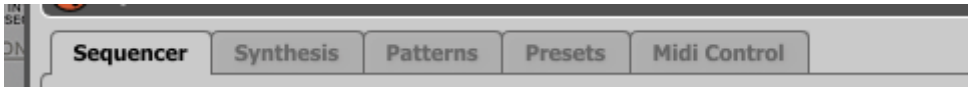
➲ *Note: Files saved by Phoscyon are compatible with **XML** format, which enables their edition in any text editor.*

Configuration



Options button

After clicking on **Options** in the upper-left corner of GUI, a configuration panel unfolds. The panel has several tabs:



Configuration panel tabs

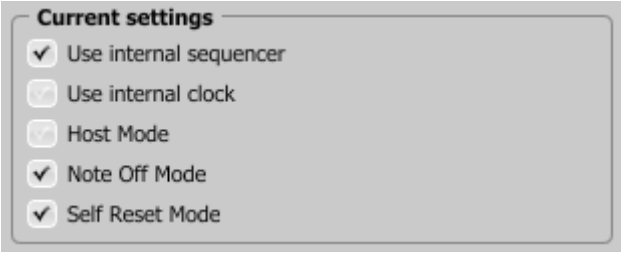
- **Sequencer** – configures sequencer's work mode.
- **Synthesis** – configures default and current synthesis track.
- **Presets** – indicates personal resources loaded instead of default presets.
- **Patterns** – indicates personal pattern banks loaded with every new instance of the plug-in in the host application.
- **Midi control** – configures MIDI communications with the plug-in.

Clicking on **Options** while holding **CTRL** opens a window with information about the version and the license owner.

Sequencer tab

Current Settings

Current Settings checkboxes:



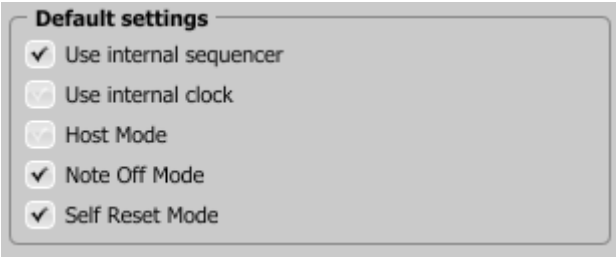
Current settings

reflect the state of controls from the **Seq.Settings** section on GUI.

Plugin modes

The **Note Off Mode** and the **Self Reset Mode** state checkboxes are exceptions and are not available on GUI. They are only available in this tab (**Host** mode – description available in earlier chapters).

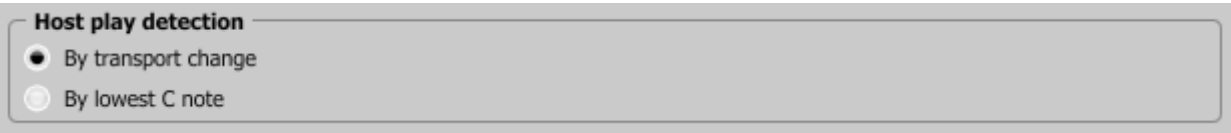
Default Settings



Default settings

Default Settings group contains checkboxes with default flag values for the **Current Settings** group. In every new instance of the plug-in, in the host application, the **Default Settings** flags are overwritten on the **Current Settings** flags. **Default Settings** values are saved in the Phoscyon configuration file and applies to all new instances of the plug-in. When removing any instance of the plug-in from the host application the configuration file is saved.

Host play detection



Host play detection flag

This solves sync problems with some hosts. It mainly concerns **Native** mode. The properly written host should send a **Transport Change** code to the plug-in after pressing the **Play** button in the host application.

When the **By Transport Change** option is selected, then don't need to add an extra Midi track to force the plug - in to start to play. It should start to play automatically. In some cases it doesn't work. If this happens, choose the **By The lowest**

C Note option. Then, add a Midi track with output set to Phoscyon and place the Midi note (lowest C note) in the Midi clip. As soon as the Midi Note On is sent to the plug-in, Phoscyon will start playing.

Presets tab

Preset Storing

Using Prev, Next buttons or the Preset Browser navigates through the preset bank. Any change in the current preset can be stored automatically or on demand. Depending on the selection one of the two options is active:

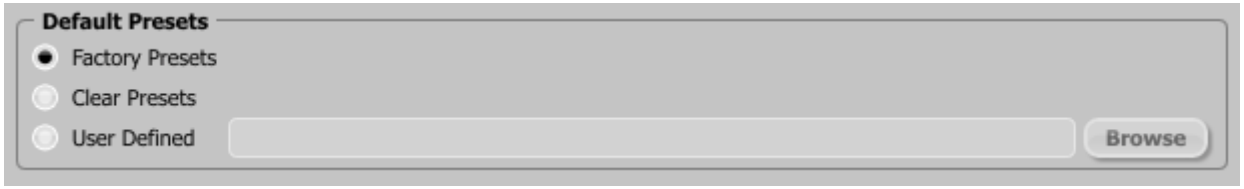
Preset Storing flag

- **Automatic** – Any change of a parameter in the current preset is automatically stored.
- **On Demand** – If any parameter is changed, the change is not saved in the current preset until the **Store** option is used (**CTRL** + **Browse**). Selecting a different preset from the bank causes irreversible loss to changes applied to the parameters, unless the **Store** option is used.

The **Preset Storing** flag is saved in the Phoscyon configuration file and applies to all new instances of the plug-in. When removing any instance of the plug-in from the host application the configuration file is saved.

Default Presets

D16 provides a set of default presets with Phoscyon. They are applied to every new instance of the plug-in. If a bank of presets is created which should be applied every time instead of factory presets, it is possible to select such an on option **Default Presets** section:



Default Presets selection

Options available in the **Default Presets** section:

- **Factory Presets** – Default value after installing Phoscyon. Choosing this option loads the factory presets with every new instance of the plug-in.
- **Clear Preset** – Zeroed parameters with every new instance of the plug-in.
- **User Defined** – Preset bank selected by the user. When choosing User Defined option, the **Browse** button on the right side is activated. Using this button opens a dialog box in order to select a path to the user's preset bank. Confirming the path saves it in the Phoscyon configuration file. The selected preset bank will be loaded as default.

  The text box on the left from the **Browse** button shows the path to the user's preset bank.

Patterns tab

There're included some default patterns and drum kits with Phoscyon. These are loaded every time it is started. This can be changed to point to user default patterns and kits.

If a bank of patterns is created which should be applied every time instead of factory pattern bank, it is possible to select such an on option **Default Pattern** section:

Default Patterns selection

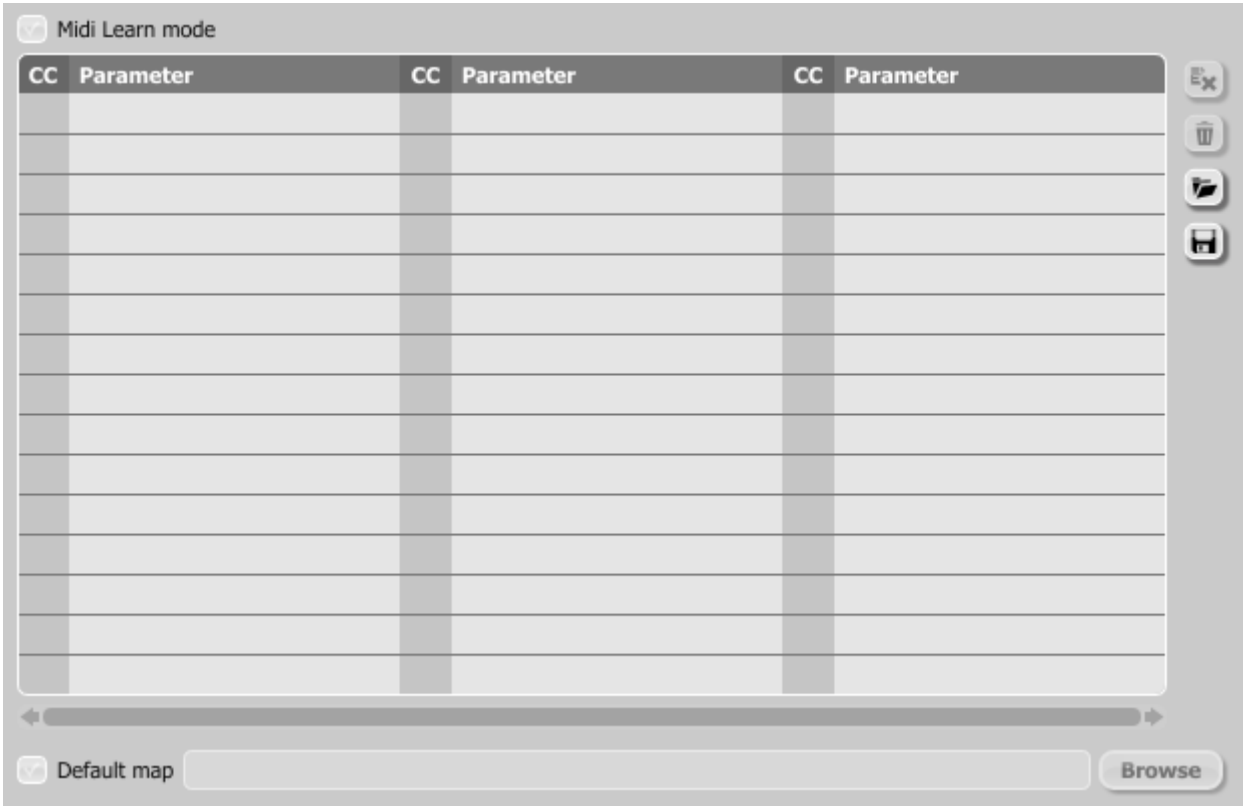
Options available in the **Default Patterns** section:

- **Factory Patterns** – Default value after installing Phoscyon. Choosing this option loads the factory patterns with every new instance of the plug-in.
- **Clear Patterns** – With every new instance of the plug-in an empty preset bank is loaded.
- **User Defined** – Patterns bank selected by the user. When choosing User Defined option, the **Browse** button on the right side is activated. Using this button opens a dialog box in order to select a path to the user's patterns bank. Confirming the path saves it in the Phoscyon configuration file. The selected patterns bank will be loaded as default.

  The text box on the left from the **Browse** button shows the path to the user's preset bank.

Midi control tab

Phoscyon can assign its controls (on GUI) to any MIDI CC (Midi Control Change), allowing the control of the plug-in using external hardware or software.



Midi control tab

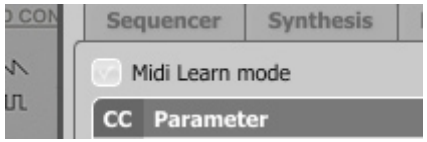
Controls included in the tab:

- **Midi learn mode** – Checkbox which activates Midi learn mode.
- A list of active MIDI CC links containing pairs comprising of a CC code and the name of the plug-in parameter.
- **Default Map** – Checkbox which activates a default MIDI CC map. When the map is activated it will be loaded with creating a new instance of the plug-in.

Midi learn

Assigning a Phoscyon control to the MIDI controller requires:

1. Checking **Midi Learn Mode** checkbox in the **Midi Control** tab:

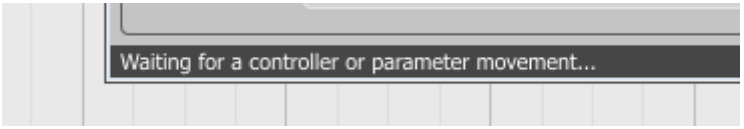


Midi Learn Mode selection checkbox

or press the **Midi Learn** button in the **Midi** section on GUI:

Midi section

2. In the status bar in the bottom section of GUI a message should appear *"waiting for a controller or parameter movement..."*:

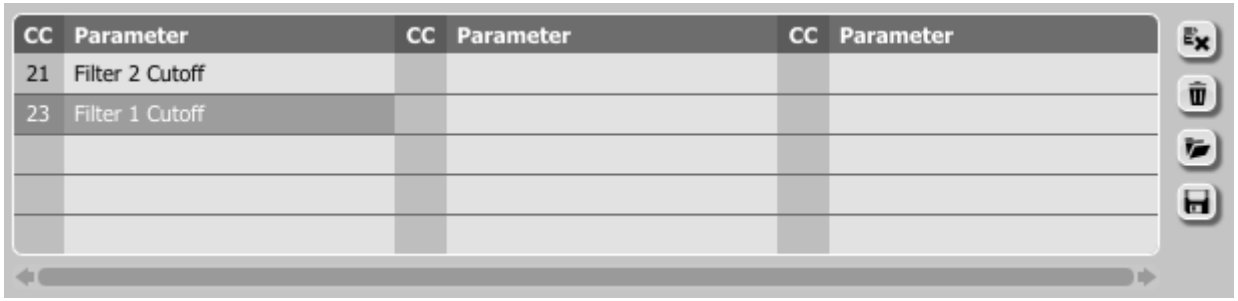


Status bar

In this mode the plug-in waits for any change in the parameter value (movement of any control on GUI) and for the movement of any MIDI CC control from the external MIDI controller, which operates on an active MIDI input channel directed to Phoscyon. The order of these actions is irrelevant.

During the above-mentioned actions, the status bar informs about the currently changing values of controls and provides their names.

When a MIDI control <–> GUI control link is established, a line is added to the MIDI CC link list:



MIDI CC link list and function buttons

When a link is established for a controller, it is possible to repeat the operation for the next MIDI CC and parameter pairs. Subsequent links will be created and added to the list.

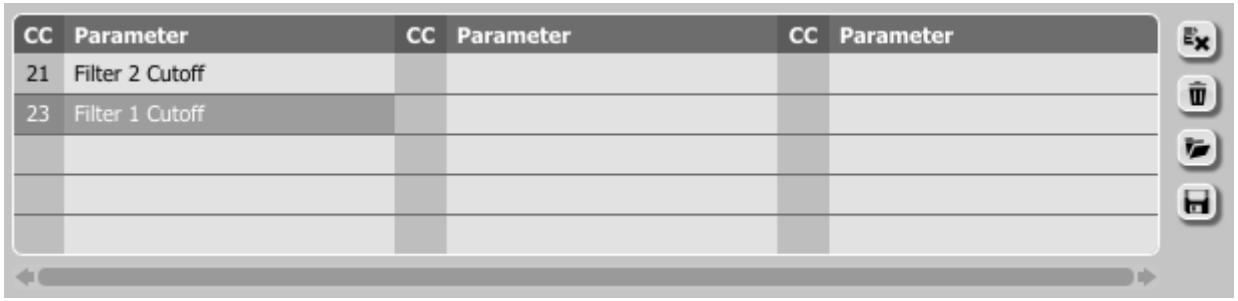
3. When all the needed links are created, uncheck the **Midi Learn Mode** checkbox or press the **Midi Learn** button in the **Midi** section on GUI again.

In order to create new links, it is possible to reactivate the **Midi Learn Mode** at any time.

The links are always sorted in an ascending manner in relation to the CC column according to the MIDI CC code.

Unlinking and midi link management

On the right side of the link list there are 4 function buttons located:



MIDI CC link list and function buttons

 – Removes a selected link; choosing any link from the list and clicking on it highlights the selected link. Using this button removes the selected link.

 – Removes all MIDI CC links.

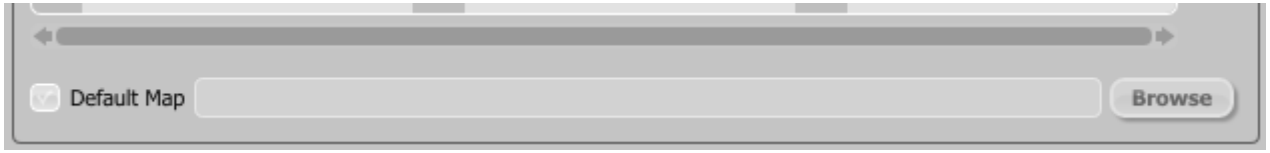
 – Loads link lists/MIDI maps from file (.phccmap – Phoscyon MIDI CC Map).

 – Saves link lists/MIDI maps to file.

➲ *Note: MIDI map files are saved in **XML** format, which enables their edition in any text editor.*

Default MIDI Map

Selecting a default MIDI Map:



Default MIDI Map selection

1. Check the **Default Map** checkbox, which activates the **Browse** button on the right.
2. Click **Browse** and select a file with a saved MIDI Map.

After selecting the MIDI map the text box on the left from the **Browse** button shows the path to the active map file.
A default MIDI map is loaded each time when the plug-in is loaded.

d16 group

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